

CATHETER WITH EXPANSION UNIT

Publication number: JP8317969 (A)

Publication date: 1996-12-03

Inventor(s): HARADA KINYA

Applicant(s): TERUMO CORP

Classification:

- **international:** A61L29/00; A61M25/00; A61M29/02; A61L29/00; A61M25/00;
A61M29/02; (IPC1-7): A61L29/00; A61M29/02

- **European:**

Application number: JP19950126510 19950525

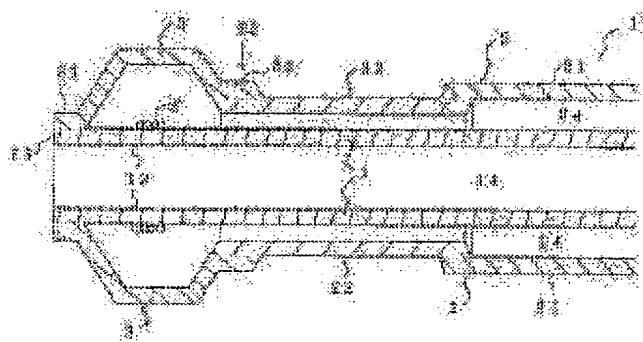
Priority number(s): JP19950126510 19950525

Also published as:

 JP3335795 (B2)

Abstract of JP 8317969 (A)

PURPOSE: To eliminate possibility of leak or the like in a fused part by providing a catheter with an expansion unit, whose base end is fused and connected with the tip end of the outer tube, whose tip end is attached to the inner tube, and whose base end or the proximity communicates with the lumen, and thereby surely connecting the expansion unit with the outer tube. **CONSTITUTION:** The inner tube 1 is provided with a base end part, tip end part 12, first lumen 14 with an open end 13, and X-ray contrast marker 15 for showing the position of the expansion unit 3. The outer tube 2 is formed coaxially to the inner tube 1, equipped with a main body 21 and a tip end part 22, and arranged at a prescribed position 23, forming a second lumen 24. In addition, the tip end part 22 is composed of a noncross-linked olefin resin, the main body 21 is composed of a cross-linked olefin resin and both are fused. Further, the expansion unit 3 is fused at the base end part 32 with the tip end part 22 of the outer tube 2, with the tip end part 31 fused with the tip end 13 of the inner tube 1; the expansion unit is composed of a cross-linked olefin resin, having a bulged part communicating with the second lumen 24 in the proximity of the base end part 32.



特開平8-317969

(43)公開日 平成8年(1996)12月3日

(51)Int.Cl.⁶

A 6 1 L 29/00

A 6 1 M 29/02

識別記号

序内整理番号

F 1

技術表示箇所

A 6 1 L 29/00

W

A 6 1 M 29/02

審査請求 未請求 請求項の数 3 O.L (全 7 頁)

(21)出願番号 特願平7-126510

(22)出願日 平成7年(1995)5月25日

(71)出願人 000109543

テルモ株式会社

東京都渋谷区幡ヶ谷2丁目44番1号

(72)発明者 原田 金弥

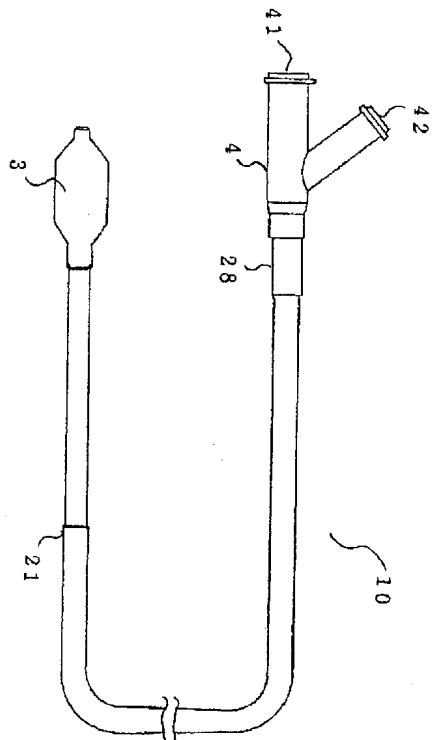
静岡県富士宮市舞々木町150番地 テルモ
株式会社内

(54)【発明の名称】 拡張体付カテーテル

(57)【要約】

【目的】拡張体と外管の接続部分にリークなどがなく、確実な融着強度を有する拡張体付カテーテルの提供。

【構成】基端部と先端部を有し、先端が開口する第1のルーメンを有する内管と、該内管に同軸的に設けられ、本体部分と先端部分と有し、該内管の先端より所定長後退した位置に設けられ、該内管の外面との間に第2のルーメンを形成し、該先端部分は未架橋オレフィン系樹脂、該本体部分は架橋オレフィン系樹脂からなり、該先端部分と該本体部分は融着接続されている外管と、先端部および基端部を有し、該基端部は前記外管の先端部分と融着接続され、該先端部は前記内管に取り付けられ、該基端部付近にて前記第2ルーメンと連通する収縮あるいは折り畳み可能な架橋オレフィン系樹脂からなる拡張体と、該内管の基端部に設けられた前記第1のルーメンと連通する第1の開口部と、前記外管の本体部分の基端に設けられた前記第2のルーメンと連通する第2の開口部とを有する拡張体付カテーテルである。



【特許請求の範囲】

【請求項1】基端部と先端部を有し、先端が開口する第1のルーメンを有する内管と、

該内管に同軸的に設けられ、本体部分と先端部分と有し、該内管の先端より所定長後退した位置に設けられ、該内管の外面との間に第2のルーメンを形成し、該先端部分は未架橋オレフィン系樹脂、該本体部分は架橋オレフィン系樹脂からなり、該先端部分と該本体部分は融着接続されている外管と、

先端部および基端部を有し、該基端部は前記外管の先端部分と融着接続され、該先端部は前記内管に取り付けられ、該基端部付近にて前記第2ルーメンと連通する収縮あるいは折り畳み可能な架橋オレフィン系樹脂からなる拡張体と、

該内管の基端部に設けられた前記第1のルーメンと連通する第1の開口部と、前記外管の本体部分の基端に設けられた前記第2のルーメンと連通する第2の開口部とを有することを特徴とする拡張体付カテーテル。

【請求項2】前記外管の本体部分の内側に金属補強体を設けたことを特徴とする請求項1に記載の拡張体付カテーテル。

【請求項3】前記金属補強体は管状であり、先端部がコイル状であることを特徴とする請求項2に記載の拡張体付カテーテル。

【発明の詳細な説明】

[0 0 0 1]

【産業上の利用分野】本発明は心筋梗塞などの原因となる心臓動脈の狭窄部位に挿入して拡張する手技に用いる拡張体付きカテーテルに関する。

[0 0 0 2]

【従来の技術】従来の血管内の狭窄部を拡張する拡張体付カテーテルとしては、例えば、特開平3-73167号公報に示されるものがある。この公報に記載の拡張体付カテーテルの拡張体の取り付け状態は、図6に示すごとく、内管101と、この内管101と同軸的に設けられた外管102と、内管101および外管102に取り付けられた拡張体103とからなり、外管102と拡張体103の接続は外管102の先端104と拡張体103の基端部105の融着しろ106、107を重ね合わせた状態で加熱し、融着を行っている。

[0 0 0 3]

【発明が解決しようとする課題】前述のカテーテルでは、外管と拡張体の融着強度が両者の材質により、大きく変わることがあった。また、オレフィン系樹脂からなる拡張体や外管は耐圧強度をあげるために、架橋されていることがある。しかしながら、このような架橋オレフィン系樹脂からなる材質同士を融着により接着した場合、高い融着強度が望めず、リーク等が発生する虞れがあった。

【0004】本発明はこのような低い融着強度に起因す

るリーク等の虞れのなく、耐圧強度の拡張体付カテーテルを提供することを課題とする。

[0005]

【課題を解決するための手段】この課題は以下の(1)～(3)に示す本発明の拡張体付カテーテルによって解決される。

【0006】(1) 基端部と先端部を有し、先端が開口する第1のルーメンを有する内管と、該内管に同軸的に設けられ、本体部分と先端部分と有し、該内管の先端上

10 り所定長後退した位置に設けられ、該内管の外面との間に第2のルーメンを形成し、該先端部分は未架橋オレフィン系樹脂、該本体部分は架橋オレフィン系樹脂からなり、該先端部分と該本体部分は融着接続されている外管と、先端部および基端部を有し、該基端部は前記外管の先端部分と融着接続され、該先端部は前記内管に取り付けられ、該基端部付近にて前記第2ルーメンと連通する収縮あるいは折り畳み可能な架橋オレフィン系樹脂からなる拡張体と、該内管の基端部に設けられた前記第1のルーメンと連通する第1の開口部と、前記外管の本体部分の基端に設けられた前記第2のルーメンと連通する第2の開口部とを有する拡張体付カテーテル。

【0007】(2) 前記外管の本体部分の内側に金属補強体を設けた上記(1)に記載の拡張体付カテーテル

【0008】(3) 前記金属補強体は管状であり、先端部がコイル状である上記(2)に記載の拡張体付カテーテル。

【0009】本発明の拡張体付カテーテルは上記(1)のように、架橋オレフィン系樹脂からなる拡張体の基端部と、架橋オレフィン系樹脂からなる外管の先端部分は融着により接続されている。これらの融着接続は、架橋オレフィン同士と比較して、相溶性が高く、強固な融着が実現できる。また外管は本体部分と先端部分の接着も同様に架橋オレフィン系樹脂と未架橋オレフィン系樹脂の融着からなっており、強固な融着となっており、未架橋オレフィン系樹脂の先端部分を介して間接的ではあるが、架橋オレフィン系樹脂の外管と架橋オレフィン系樹脂の拡張体とを強固に接続することが可能となる。

【0010】ここで未架橋オレフィン系樹脂とは、オレフィン系樹脂の未架橋体を示すだけでなく、わずかに架橋したものも含むものであり、架橋オレフィン系樹脂よりは架橋度が低いものも含むものである。

【0011】これらの融着接続は以下のようにして実現できる。

【0012】1. 未架橋オレフィン系樹脂の外管の先端部分に金属の芯金を通し、架橋オレフィン系樹脂の本体部分の一部を重ね合わせる。この重なった部分が融着しろとなる。

【0013】2. 続いて融着しろの部分を覆うようにシリコーン製熱収縮チューブを被せ、シリコーン製熱収縮チューブの上から加熱する。シリコーン製熱収縮チューブ

ブは熱収縮して融着しろを強く密着させた状態で、加熱されるので、強い融着強度が得られる。

【0014】3. 次に先端部分の先端に、拡張体の基端部を重ね合わせ、重ね合わせ部分を融着しろとし、さらにシリコーン製熱収縮チューブを被せた後、加熱する。上記2と同様に強い融着強度の接続部が得られる。

【0015】このようにして簡単に融着強度の高い接続を実現できる。

【0016】次に上記(2)のように外管の本体部分の内側に金属補強体を設けたので、トルク伝達性も高く、押し込み特性も向上する。

【0017】また、上記(3)のように補強体を管状とし、先端はコイル状とした事により、耐キンク性に優れるようになる。このような補強体を外管内に設ける方法としては、予め外管の径をコイルよりも大きいものを準備しておき、この外管内にコイルを挿入(ただし、先端から所定の部分は融着しろとするために、コイルは挿入しない)したのち、加熱すると、外管は収縮しコイルの外表面に密着した状態となる。外管と補強体が完全に密着することにより、トルク伝達性に優れ、耐キンク性も向上し、操作性に優れるようになる。

【0018】

【実施例】以下、本発明の実施例を参照して発明の内容を詳細に説明する。

【0019】

【実施例1】図1は本発明の拡張体付カテーテル10の全体図である。図2は拡張体付カテーテル10の拡張体が付いた先端部分の拡大部分断面図である。

【0020】図に示すように拡張体付カテーテル10は内管1、外管2、拡張体3と、基端に設けられたハブ4とからなっている。

【0021】内管1は直径0.6mmで肉厚0.075mm、長さ1500mmの高密度ポリエチレン製であり、基端部と先端部12を有し、先端13が開口する第1のルーメン14を有し、拡張体3の位置を示すために、X線造影マーカー(プラチナコイル)15が設けられている。

【0022】また、外管2は内管1に同軸的に設けられ、本体部分21と先端部分22と有し、本体部分の直径1.07mm、長さ1270mm、先端部分の直径0.9mm、長さ80mmであり、肉厚は共に0.075mmである。また、内管1の先端13より所定長後退した位置23に設けられ、外管2の内面との間に第2のルーメン24を形成し、先端部分22は未架橋オレフィン系樹脂(線状低密度ポリエチレン(エチレン-ヘキセン共重合体(C₆LLDPE)))からなり、本体部分21は架橋オレフィン系樹脂(線状低密度ポリエチレン(エチレン-ヘキセン共重合体(C₆LLDPE)))の電子線架橋品)からなっており、両者は融着接続されている。

【0023】さらに、拡張体3は、先端部31および基端部32を有し、基端部32は外管2の先端部分22と融着接続され、先端部31は内管1の先端13に融着接続され、基端部32付近にて第2ルーメン24と連通する収縮あるいは折り畳み可能な拡張部を有する架橋オレフィン系樹脂(線状低密度ポリエチレン(エチレン-ヘキセン共重合体(C₆LLDPE)))の電子線架橋品)からなっている。先端部31は外径が0.7mmで、肉厚が0.15mmであり、基端部32は外径が1mmで、肉厚が0.12mmである。また、拡張部は拡張した時の外径が2.5mmであり、肉厚0.03mmである。拡張体の全長は27mmである。拡張体の寸法は適用される部位によって、任意に変更が可能である。

【0024】そして、ハブ4は、内管1の基端部に設けられた前記第1のルーメン14と連通する第1の開口部41と、外管2の本体部分21の基端に設けられた第2のルーメン24と連通する第2の開口部42とを有している。

【0025】またハブ4と外管2の本体部分21の基端の接続部にはキンク防止用の補強チューブ28が設けられている。

【0026】図3と図4は融着方法を示す部分断面図である。図3は外管2の本体部分21と先端部分22の融着に関し、図4は外管2の先端部分22と拡張体3の基端部32の融着に関するものである。

【0027】両図を用いて、融着方法について説明する。

【0028】1. 外管2の先端部分22に金属の芯金50(直径0.75mm、ステンレス線(SUS304))を通した後、本体部分21の一部を重ね合わせるように本体部分21を芯金50に被せる。この重なった部分が融着しろ25となる。

【0029】2. 続いて融着しろ25の部分を覆うようにシリコーン製熱収縮チューブ26を被せ、シリコーン製熱収縮チューブ26の上から加熱(130~140°Cで約10秒)する。シリコーン製熱収縮チューブ26は熱収縮して融着しろ25を強く密着させた状態で、加熱融着されるので、強い融着強度を持つ融着部が得られる。(図3参照)

40 3. 次に先端部分22の先端に、拡張体3の基端部32を重ね合わせ、重ね合わせ部分を融着しろ27とし、さらにシリコーン製熱収縮チューブ26を被せた後、加熱する。上記2と同様にシリコーン製熱収縮チューブ26は熱収縮して融着しろ27を強く密着させた状態で加熱されるので、強い融着強度の融着部が得られる。(図4参照)

また、加熱融着の際に外管2の本体部分21の融着に関与しない部分や、拡張体3の拡張部が熱的影響を受けないようにするために保護チューブ29を被せておくといい。

【0030】4. 融着後、シリコーン製熱収縮チューブ26、26を取り除く。

【0031】このようにして外管2と拡張体3を接続した後、続いて内管1の先端13と拡張体3の先端部31を接続する。内管1は高密度ポリエチレン樹脂からなり、内管1に芯金(0.4mmステンレス線(SUS304))を通した状態で、拡張体3の先端部31と内管1の先端13を重ね合わせ、シリコーン製熱収縮チューブを被せたのち、加熱(130~140°Cで約20秒)する。熱収縮して圧縮された状態で融着される。

【0032】続いて、外管2の本体部分22の基端から補強チューブ28を被せた後、そして、ハブ4を第1の開口部41が第1のルーメン14と、第2の開口部42と第2のルーメン24とが連通するように接続して本体部分22の基端に固定し、最後に補強チューブ28をスライドさせて、ハブに覆いかぶさるようにして固定(接着)する。

【0033】以上のようにして、拡張体付カテーテル10が作成される。作成された拡張体付カテーテル10は拡張体3の基端部32と外管2の先端部分22は互いに相溶性があり、確実に融着でき、リーク等の懼れがなくなる。

【0034】

【実施例2】第2の実施例について説明する。図5は第2の実施例にかかる拡張体付カテーテルの部分断面図である。

【0035】図5に示すように、第1の実施例の拡張体付カテーテル10の外管2の内部には超弾性金属パイプ50からなる補強体が入っている構造である。補強体50は直径1.0mmで厚みが0.07mmで、先端から全長の3分の1まではコイル状になっており、先端付近のピッチは0.5mmぐらいであり、基端方向に向けて徐々にピッチが広がっている。

【0036】作成方法について述べる。

【0037】1. 先端から500mmまで、コイル状(先端(コイルピッチ0.5mm)から基端に向けてコイルピッチが拡大している)をしているチタンニッケル合金からなる超弾性パイプ50(全長約1m50cm、直径1.0mm厚さ0.07mm)を準備する。続いて、架橋オレフィン系樹脂(線状低密度ポリエチレン(エチレン-ヘキセン共重合体(C6LDPE))の電子線架橋品)からなる外管本体形成用チューブ(内径1.05mm)を超弾性パイプ50に外管本体の先端から5mmぐらいパイプ先端を後退させた状態で被せる。この後加熱して縮径させ超弾性パイプ50と外管本体形成用チューブを密着させる。この後退させた樹脂単体の部分が先端部分22との融着しろ25となる。

【0038】この後の第2実施例の作成方法は第1の実施例と同様である。第2の実施例は第1の実施例とは外管の本体部分21が異なるだけで、他の作成方法及び構

成は同じとなる。

【0039】第2の実施例は補強体(超弾性パイプ50)が入っているために、耐キンク性にすぐれ、また良好なトルク伝達性を示す。さらに先端部分は補強体が入っていないので、柔軟性が高くなり、また、本体部分より、細く形成でき、屈曲度が高く細い適用部位でも高い操作性を得ることができる。

【0040】また本実施例では、外管の本体部分21と先端部分22とを先に融着したが、拡張体3の基端部32と先端部分22を先に融着しても良い。

【0041】

【発明の効果】本発明の拡張体付カテーテルは基端部と先端部を有し、先端が開口する第1のルーメンを有する内管と、該内管に同軸的に設けられ、本体部分と先端部分と有し、該内管の先端より所定長後退した位置に設けられ、該内管の外面との間に第2のルーメンを形成し、該先端部分は未架橋オレフィン系樹脂、該本体部分は架橋オレフィン系樹脂からなり、該先端部分と該本体部分は融着接続されている外管と、先端部および基端部を有し、該基端部は前記外管の先端部分と融着接続され、該先端部は前記内管に取り付けられ、該基端部付近にて前記第2ルーメンと連通する収縮あるいは折り畳み可能な架橋オレフィン系樹脂からなる拡張体と、該内管の基端部に設けられた前記第1のルーメンと連通する第1の開口部と、前記外管の本体部分の基端に設けられた前記第2のルーメンと連通する第2の開口部とを有するためには、拡張体と外管との確実な接続が行われ、融着部におけるリーク等の懼れがなくなる。

【0042】また、本発明の拡張体付カテーテルは前記外管の本体部分の内側に金属補強体を設けたことにより、耐キンク性やトルク伝達性に優れ、さらに、先端部分はチューブのみなので細く形成でき、また特別に柔軟性にすることも可能であり、屈曲が激しく、細い血管においても操作性が良好である。さらに、本発明の拡張体付カテーテルは前記金属補強体は管状であり、先端部がコイル状であることから、補強体は先端部が基端部に比べて柔軟になっており、カテーテル全長にわたって基端から先端に向けて柔軟性を高めることができる。

【図面の簡単な説明】

【図1】図1は本発明の拡張体付カテーテルの全体図である。

【図2】図2は本発明の拡張体付カテーテルの拡張体が付いた先端部分の拡大部分断面図である。

【図3】図3は外管の本体部分と先端部分の融着方法を説明するための図である。

【図4】図4は外管の先端部分と拡張体の基端部の融着方法を説明するための図である。

【図5】図5は本発明の第2の実施例にかかる拡張体付カテーテルの部分断面図である。

【図6】図6は従来の拡張体付カテーテルの拡張体の取

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り付け部を示す。

【符号の説明】

10・・・拡張体付カテーテル

1・・・内管1

2・・・外管

3・・・拡張体

4・・・ハブ

12・・・先端部

13・・・先端

14・・・第1のルーメン

15・・・X線造影マーカー

21・・・本体部分

22・・・先端部分

23・・・後退した位置

24・・・第2のルーメン

25, 27・・・融着しろ

26・・・シリコーン製熱収縮チューブ

28・・・補強チューブ

29・・・保護チューブ

31・・・先端部

32・・・基端部

41, 42・・・開口部

50・・・芯金

10 101・・・内管101

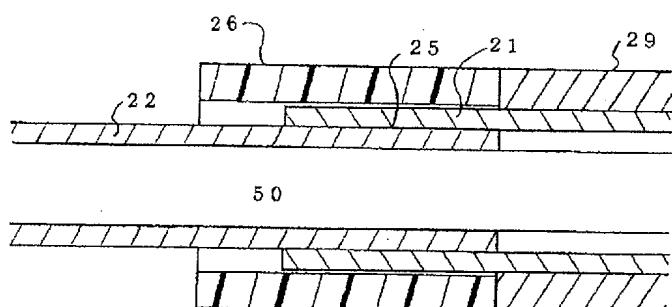
102・・・外管102

103・・・拡張体

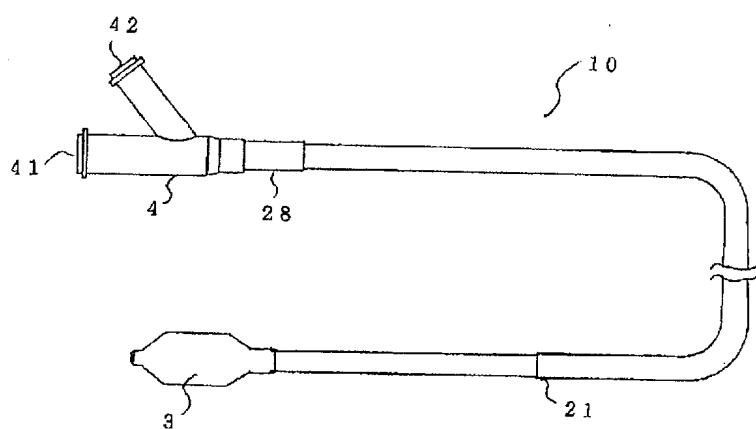
105・・・基端部

106, 107・・・融着しろ

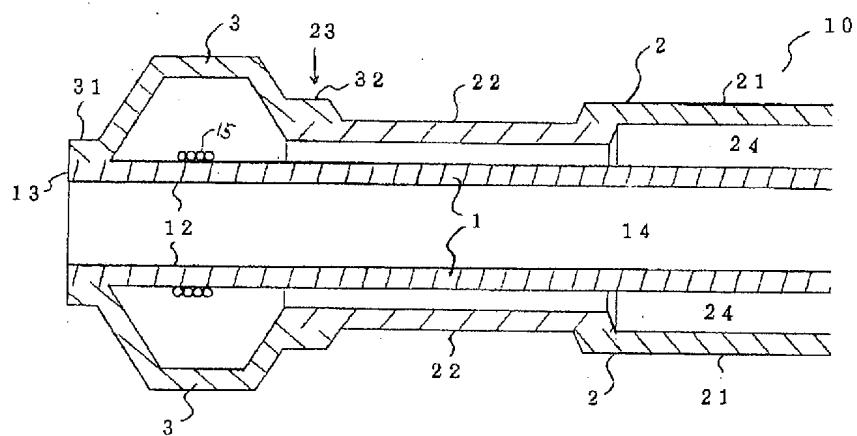
【図1】



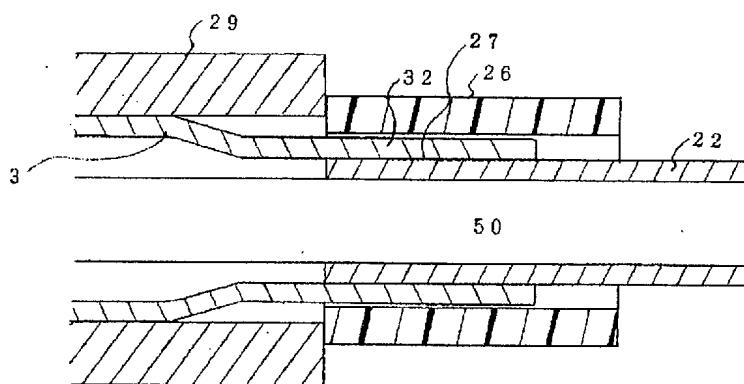
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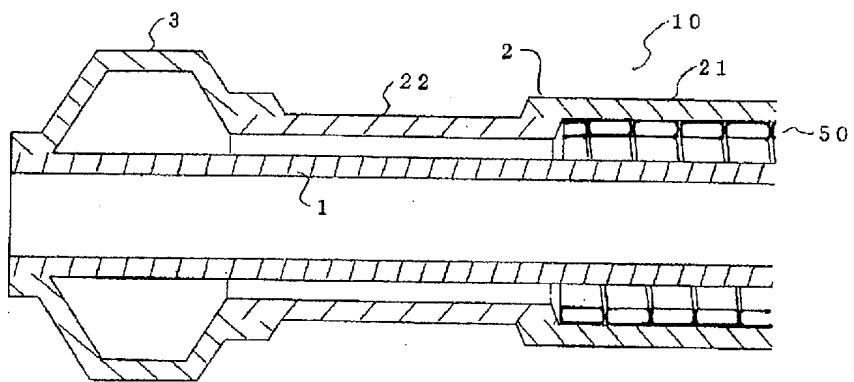
【図3】



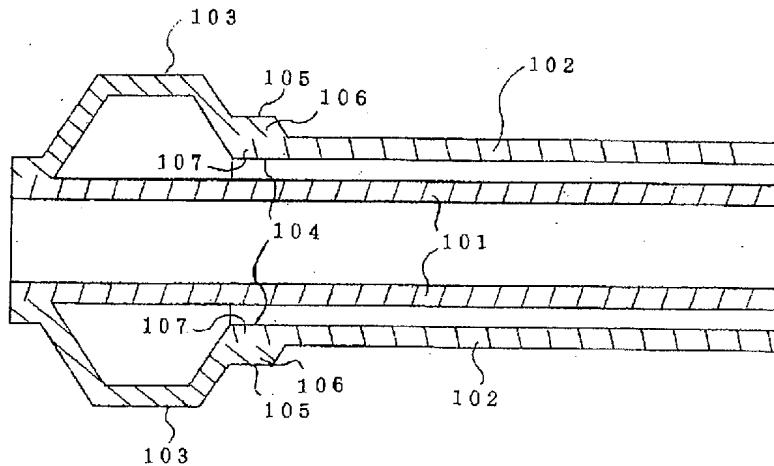
【図4】



【図5】



【図6】



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CLAIMS

[Claim(s)]

[Claim 1]A catheter with an expansion body characterized by comprising the following.
An inner tube which has a base end and a tip part and has the 1st lumen in which a tip carries out an opening.
Are provided in this inner tube in same axle, and have with a body part and a tip end part, and it is provided in a position which carried out specified length retreat from a tip of this inner tube,
An outer tube by which the 2nd lumen is formed between outside surfaces of this inner tube,
as for this tip end part, unconstructed bridge olefin system resin and this body part consist of bridge construction olefin system resin, and fusion splicing is carried out as for this tip end part and this body part.
An expansion body which consists of bridge construction olefin system resin which it has a tip part and a base end, fusion splicing of this base end is carried out to a tip end part of said outer tube, and this tip part is attached to said inner tube, and is open for free passage with said 2nd lumen near [this] a base end, and in which contraction or folding is possible.
Said 1st lumen provided in a base end of this inner tube, the 1st opening open for free passage, and said 2nd lumen provided in a end face of a body part of said outer tube and the 2nd opening open for free passage.

[Claim 2]The catheter with an expansion body according to claim 1 providing a metal reinforcement body inside a body part of said outer tube.

[Claim 3]The catheter with an expansion body according to claim 2, wherein said metal reinforcement body is tubular and a tip part is a coiled form.

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DETAILED DESCRIPTION

[Detailed Description of the Invention]

[0001]

[Industrial Application] This invention relates to the catheter with an expansion body used for the technique inserted and extended to the strangulation part of the heart artery used as causes, such as myocardial infarction.

[0002]

[Description of the Prior Art] As a catheter with an expansion body which extends the narrow segment in the conventional blood vessel, there are some which are shown in JP,3-73167,A, for example. The attachment state of the expansion body of a catheter with an expansion body given in this gazette, The outer tube 102 provided in same axle with the inner tube 101 and this inner tube 101 as shown in drawing 6, consist of the expansion body 103 attached to the inner tube 101 and the outer tube 102, and the tip 104 of the outer tube 102 and the base end 105 of the expansion body 103 should weld connection of the outer tube 102 and the expansion body 103 -- it is welding by heating, where 107 is piled up, 106 and.

[0003]

[Problem(s) to be Solved by the Invention] In the above-mentioned catheter, the fusing strength of an outer tube and an expansion body might change a lot according to both construction material. The bridge may be constructed over the expansion body and outer tube which consist of olefin system resin in order to raise pressure resistance. However, when the construction material which consist of such bridge construction olefin system resin was pasted up by weld, high fusing strength could not be expected but there was a possibility that leak etc. might occur.

[0004] This invention does not have fear, such as leak resulting from such low fusing strength, and let it be SUBJECT to provide the catheter with an expansion body of pressure resistance.

[0005]

[Means for Solving the Problem] This SUBJECT is solved by a catheter with an expansion body of this invention shown in the following (1) - (3).

[0006](1) An inner tube which has a base end and a tip part and has the 1st lumen in which a tip carries out an opening, Are provided in this inner tube in same axle, and have with a body part and a tip end part, and it is provided in a position which carried out specified length retreat from a tip of this inner tube, An outer tube by which the 2nd lumen is formed between outside surfaces of this inner tube, as for this tip end part, unconstructed bridge olefin system resin and this body part consist of bridge construction olefin system resin, and fusion splicing is carried out as for this tip end part and this body part, Have a tip part and a base end and fusion splicing of this base end is carried out to a tip end part of said outer tube, An expansion body which consists of bridge construction olefin system resin which this tip part is attached to said inner tube, and is open for free passage with said 2nd lumen near [this] a base end, and in which contraction or folding is possible, A catheter with an expansion body which has said 1st lumen provided in a base end of this inner tube, the 1st opening open for free passage, and said 2nd lumen provided in a end face of a body part of said outer tube and the 2nd opening open for free passage.

[0007](2) A catheter with an expansion body given in the above (1) which provided a metal reinforcement body inside a body part of said outer tube.

[0008](3) A catheter with an expansion body given in the above (2) whose tip part said metal reinforcement body is tubular and is a coiled form.

[0009]A tip end part of an outer tube which a catheter with an expansion body of this invention becomes from a base end and bridge construction olefin system resin of an expansion body which consists of bridge construction olefin system resin like the above (1) is connected by weld. As compared with bridge construction olefins, such fusion splicing has high compatibility and can realize firm weld. Adhesion of a body part and a tip end part consists of weld of bridge construction olefin system resin and unconstructed bridge olefin system resin similarly, and an outer tube serves as firm weld, and via a tip end part of unconstructed bridge olefin system resin, although it is indirect, It becomes possible to connect firmly an outer tube of bridge construction olefin system resin, and an expansion body of bridge construction olefin system resin.

[0010]What constructed the bridge slightly is included here unconstructed bridge olefin system resin not only shows a non-bridging body of olefin system resin, but, and what has a degree of cross linking lower than bridge construction olefin system resin is included.

[0011]Such fusion splicing is realizable as follows.

[0012]1. Lay a part of body part of through and bridge construction olefin system resin on top of a tip end part of an outer tube of unconstructed bridge olefin system resin for metaled rodding. This overlapping portion is should weld.

[0013]2. Put heat-shrinkable tubing made from silicone so that it continues, and it may weld and a portion of ** may be covered, and heat from heat-shrinkable tubing made from silicone. Since heat-shrinkable tubing made from silicone is heated where it carried out heat contraction, it welded and ** is stuck strongly, strong fusing strength is obtained.

[0014]3. Heat after piling up a base end of an expansion body, supposing "Weld a superposition part" and putting heat-shrinkable tubing made from silicone at a tip of a tip end part further next. A terminal area of strong fusing strength is obtained like the above 2.

[0015]Thus, it is easily realizable of high connection of fusing strength.

[0016]Next, since a metal reinforcement body was provided inside a body part of an outer tube like the above (2), torque convectivity is also high and the pushing characteristic also improves.

[0017]A reinforcement body is made tubular like the above (3), and a tip comes to be excellent in kink-proof nature by having considered it as a coiled form. As a method of forming in an outer tube, such a reinforcement body, A larger thing than a coil is beforehand prepared for a path of an outer tube, and if it heats after inserting a coil into this outer tube (however, a coil is not inserted in order that a predetermined portion may presuppose from a tip "weld"), an outer tube will be in the state where contracted and it stuck to an outside surface of a coil. When an outer tube and a reinforcement body stick thoroughly, it excels in torque convectivity, and kink-proof nature also improves and it comes to excel in operativity.

[0018]

[Example]Hereafter, with reference to the example of this invention, the contents of the invention are explained in detail.

[0019]

[Work example 1]Drawing 1 is the general drawing of the catheter 10 with an expansion body of this invention. Drawing 2 is the expansion part sectional view of a tip end part to which the expansion body of the catheter 10 with an expansion body was attached.

[0020]As shown in a figure, the catheter 10 with an expansion body consists of the inner tube 1, the outer tube 2, the expansion body 3, and the hub 4 provided in the end face.

[0021]The inner tube 1 is a product made from high density polyethylene the thickness of 0.075 mm, and 1500 mm in length in 0.6 mm in diameter, and in order to have a base end and the tip part 12, to have the 1st lumen 14 in which the tip 13 carries out an opening and to show the position of the expansion body 3, the X ray imaging marker (platina coil) 15 is established.

[0022]The outer tube 2 is formed in the inner tube 1 in same axle, and has with the body part 21 and the tip end part 22, it is 1270 mm in length, 0.9 mm in 1.07 mm in diameter of a body part, and diameter of a tip end part, and 80 mm in length, and both thickness is 0.075 mm. It is provided in the position 23 which carried out specified length retreat from the tip 13 of the inner tube 1, and the 2nd lumen 24 is formed between the inner surfaces of the outer tube 2, The tip

end part 22 consists of unconstructed bridge olefin system resin (linear low density polyethylene (ethylene-hexene copolymer (C_6 LLDPE))), The body part 21 consists of bridge construction olefin system resin (electron beam bridge construction article of linear low density polyethylene (ethylene-hexene copolymer (C_6 LLDPE))), and fusion splicing of both is carried out.

[0023]The expansion body 3 has the tip part 31 and the base end 32, and fusion splicing of the base end 32 is carried out to the tip end part 22 of the outer tube 2, Fusion splicing of the tip part 31 is carried out at the tip 13 of the inner tube 1, It consists of bridge construction olefin system resin (electron beam bridge construction article of linear low density polyethylene (ethylene-hexene copolymer (C_6 LLDPE))) which has an extension in which the 2nd lumen of 24, contraction open for free passage, or folding is possible in the base end 32 neighborhood. The base end 32 is 0.7 mm in outer diameter, is 0.15 mm in thickness, and is 1 mm in outer diameter, and the tip part 31 is 0.12 mm in thickness. An outer diameter when it extends is 2.5 mm, and an extension is 0.03 mm in thickness. The overall length of an expansion body is 27 mm. By the part applied, the size of an expansion body can be changed arbitrarily.

[0024]And the hub 4 has said 1st lumen 14 provided in the base end of the inner tube 1, the 1st opening 41 open for free passage, and the 2nd lumen 24 provided in the end face of the body part 21 of the outer tube 2 and the 2nd opening 42 open for free passage.

[0025]The armored tube 28 for kink prevention is prepared for the terminal area of the end face of the hub 4 and the body part 21 of the outer tube 2.

[0026]Drawing 3 and drawing 4 are the fragmentary sectional views showing a fusion method. As for drawing 4, drawing 3 is related with weld of the tip end part 22 of the outer tube 2, and the base end 32 of the expansion body 3 about weld of the body part 21 and the tip end part 22 of the outer tube 2.

[0027]A fusion method is explained using both figures.

[0028]1. After letting the metaled rodding 50 (mm [in diameter / 0.75], stainless lines (SUS304)) pass to the tip end part 22 of the outer tube 2, put the body part 21 on the rodding 50 so that a part of body part 21 may be piled up. this overlapping portion should weld -- it is set to 25.

[0029]2. weld continuously -- the portion of 25 -- a wrap -- put the heat-shrinkable tubing 26 made from silicone like, and heat from the heat-shrinkable tubing 26 made from silicone (it is about 10 seconds at 130-140 **). carry out heat contraction of the heat-shrinkable tubing 26 made from silicone, and weld it -- it is in the state where 25 was stuck strongly, and since heating weld is carried out, a fuse section with strong fusing strength is obtained. (Refer to drawing 3)

3. next, pile up the base end 32 of the expansion body 3 at the tip of the tip end part 22, and

weld a superposition part to it -- heat after being referred to as 27 and putting the heat-shrinkable tubing 26 made from silicone further. like the above 2, carry out heat contraction of the heat-shrinkable tubing 26 made from silicone, and weld it -- since it is heated where 27 is stuck strongly, the fuse section of strong fusing strength is obtained. (Refer to drawing 4) In order that neither the portion which does not participate in weld of the body part 21 of the outer tube 2 in the case of heating weld, nor the extension of the expansion body 3 may receive thermal effect, it is good to put the protective tubing 29.

[0030]4. Remove the heat-shrinkable tubing 26 and 26 made from silicone after weld.

[0031]Thus, after connecting the expansion body 3 with the outer tube 2, the tip 13 of the inner tube 1 and the tip part 31 of the expansion body 3 are connected continuously. After the inner tube 1 consists of high-density-polyethylene resin, is in the state which let rodding (0.4-mm stainless lines (SUS304)) pass to the inner tube 1, piles up the tip part 31 of the expansion body 3, and the tip 13 of the inner tube 1 and puts the heat-shrinkable tubing made from silicone, it is heated (it is about 20 seconds at 130-140 **). It is welded in the state where carried out heat contraction and it was compressed.

[0032]then, after putting the armored tube 28 from the end face of the body part 22 of the outer tube 2, The armored tube 28 is made to slide finally, it connects so that the lumen 14, and the 1st opening 42 and 2nd lumen 24 may open the hub 4 for free passage in the 1st opening 41, it fixes to the end face of the body part 22, it covers, and as it hangs over a hub, it fixes to it (adhesion). [2nd]

[0033]The catheter 10 with an expansion body is created as mentioned above. The base end 32 of the expansion body 3 and the tip end part 22 of the outer tube 2 have compatibility mutually, and can be welded certainly, and, as for the created catheter 10 with an expansion body, their fear, such as leak, disappears.

[0034]

[Work example 2]The 2nd example is described. Drawing 5 is a fragmentary sectional view of the catheter with an expansion body concerning the 2nd example.

[0035]As shown in drawing 5, it is the structure where the reinforcement body which consists of the superelasticity metallic pipe 50 is contained in the inside of the outer tube 2 of the catheter 10 with an expansion body of the 1st example. Thickness is 0.07 mm in 1.0 mm in diameter, a tip to 1/3 of the overall length is a coiled form, the pitch near a tip is only 0.5 mm and, as for the reinforcement body 50, the pitch is spreading gradually towards the direction of a end face.

[0036]A preparation method is described.

[0037]1. Prepare the superelasticity pipe 50 (about 1 m cm [in overall length / 50], and 1.0-mm0.07 mm in thickness in diameter) which consists of a titanium nickel alloy which is carrying out the coiled form (the coil pitch is expanded towards a end face from the tip (0.5 mm of coil

pitches)) from a tip to 500 mm. It continues, The tube for outer-tube main part formation (1.05 mm in inside diameter) which consists of bridge construction olefin system resin (electron beam bridge construction article of linear low density polyethylene (ethylene-hexene copolymer (C_6 LLDPE))) is put on the superelasticity pipe 50, where a pipe tip is retreated about 5 mm from the tip of an outer-tube main part. Heat after this, the diameter is made to reduce and the superelasticity pipe 50 and the tube for outer-tube main part formation are stuck. the portion of the resin simple substance removed after this -- the tip end part 22 -- weld -- it is set to 25.

[0038]The preparation method of the 2nd next example is the same as that of the 1st example. The 2nd example only differs in the body part 21 of an outer tube from the 1st example, and other preparation methods and composition become the same.

[0039]Since the reinforcement body (superelasticity pipe 50) is contained, the 2nd example is excellent in kink-proof nature, and shows good torque convectivity. Furthermore, since the reinforcement body is not contained, pliability can become high, and a tip end part can be formed more thinly than a body part, and can acquire high operativity even in the application site where a zigzag coefficient is high and thin.

[0040]In this example, although the body part 21 and the tip end part 22 of the outer tube were welded previously, the base end 32 and the tip end part 22 of the expansion body 3 may be welded first.

[0041]

[Effect of the Invention]The inner tube which the catheter with an expansion body of this invention has a base end and a tip part, and has the 1st lumen in which a tip carries out an opening, Are provided in this inner tube in same axle, and have with a body part and a tip end part, and it is provided in the position which carried out specified length retreat from the tip of this inner tube, The outer tube by which the 2nd lumen is formed between the outside surfaces of this inner tube, as for this tip end part, unconstructed bridge olefin system resin and this body part consist of bridge construction olefin system resin, and fusion splicing is carried out as for this tip end part and this body part, Have a tip part and a base end and fusion splicing of this base end is carried out to the tip end part of said outer tube, The expansion body which consists of bridge construction olefin system resin which this tip part is attached to said inner tube, and is open for free passage with said 2nd lumen near [this] a base end, and in which contraction or folding is possible, Since it has said 1st lumen provided in the base end of this inner tube, the 1st opening open for free passage, and said 2nd lumen provided in the end face of the body part of said outer tube and the 2nd opening open for free passage, positive connection between an expansion body and an outer tube is made, and fear, such as leak in a fuse section, is lost.

[0042]When the catheter with an expansion body of this invention provided the metal

reinforcement body inside the body part of said outer tube, It is also possible to excel in kink-proof nature or torque convectivity, to be able to form thinly further, since a tip end part is only a tube, and to make it pliability specially, crookedness is intense, and operativity is good also in a thin blood vessel. Said metal reinforcement body of the catheter with an expansion body of this invention is tubular, since the tip part is a coiled form, the tip part is flexible compared with the base end, and the reinforcement body can improve pliability towards a tip covering a catheter overall length from a end face.

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TECHNICAL FIELD

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PRIOR ART

[Description of the Prior Art] As a catheter with an expansion body which extends the narrow segment in the conventional blood vessel, there are some which are shown in JP,3-73167,A, for example. The attachment state of the expansion body of a catheter with an expansion body given in this gazette, The outer tube 102 provided in same axle with the inner tube 101 and this inner tube 101 as shown in drawing 6, consist of the expansion body 103 attached to the inner tube 101 and the outer tube 102, and the tip 104 of the outer tube 102 and the base end 105 of the expansion body 103 should weld connection of the outer tube 102 and the expansion body 103 -- it is welding by heating, where 107 is piled up, 106 and.

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EFFECT OF THE INVENTION

[Effect of the Invention]The inner tube which the catheter with an expansion body of this invention has a base end and a tip part, and has the 1st lumen in which a tip carries out an opening, Are provided in this inner tube in same axle, and have with a body part and a tip end part, and it is provided in the position which carried out specified length retreat from the tip of this inner tube, The outer tube by which the 2nd lumen is formed between the outside surfaces of this inner tube, as for this tip end part, unconstructed bridge olefin system resin and this body part consist of bridge construction olefin system resin, and fusion splicing is carried out as for this tip end part and this body part, Have a tip part and a base end and fusion splicing of this base end is carried out to the tip end part of said outer tube, The expansion body which consists of bridge construction olefin system resin which this tip part is attached to said inner tube, and is open for free passage with said 2nd lumen near [this] a base end, and in which contraction or folding is possible, Since it has said 1st lumen provided in the base end of this inner tube, the 1st opening open for free passage, and said 2nd lumen provided in the end face of the body part of said outer tube and the 2nd opening open for free passage, positive connection between an expansion body and an outer tube is made, and fear, such as leak in a fuse section, is lost.

[0042]When the catheter with an expansion body of this invention provided the metal reinforcement body inside the body part of said outer tube, It is also possible to excel in kink-proof nature or torque convectivity, to be able to form thinly further, since a tip end part is only a tube, and to make it pliability specially, crookedness is intense, and operativity is good also in a thin blood vessel. Said metal reinforcement body of the catheter with an expansion body of this invention is tubular, since the tip part is a coiled form, the tip part is flexible compared with the base end, and the reinforcement body can improve pliability towards a tip covering a catheter overall length from a end face.

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TECHNICAL PROBLEM

[Problem(s) to be Solved by the Invention] In the above-mentioned catheter, the fusing strength of an outer tube and an expansion body might change a lot according to both construction material. The bridge may be constructed over the expansion body and outer tube which consist of olefin system resin in order to raise pressure resistance. However, when the construction material which consist of such bridge construction olefin system resin was pasted up by weld, high fusing strength could not be expected but there was a possibility that leak etc. might occur.

[0004] This invention does not have fear, such as leak resulting from such low fusing strength, and let it be SUBJECT to provide the catheter with an expansion body of pressure resistance.

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MEANS

[Means for Solving the Problem] This SUBJECT is solved by a catheter with an expansion body of this invention shown in the following (1) - (3).

[0006](1) An inner tube which has a base end and a tip part and has the 1st lumen in which a tip carries out an opening, Are provided in this inner tube in same axle, and have with a body part and a tip end part, and it is provided in a position which carried out specified length retreat from a tip of this inner tube, An outer tube by which the 2nd lumen is formed between outside surfaces of this inner tube, as for this tip end part, unconstructed bridge olefin system resin and this body part consist of bridge construction olefin system resin, and fusion splicing is carried out as for this tip end part and this body part, Have a tip part and a base end and fusion splicing of this base end is carried out to a tip end part of said outer tube, An expansion body which consists of bridge construction olefin system resin which this tip part is attached to said inner tube, and is open for free passage with said 2nd lumen near [this] a base end, and in which contraction or folding is possible, A catheter with an expansion body which has said 1st lumen provided in a base end of this inner tube, the 1st opening open for free passage, and said 2nd lumen provided in a end face of a body part of said outer tube and the 2nd opening open for free passage.

[0007](2) A catheter with an expansion body given in the above (1) which provided a metal reinforcement body inside a body part of said outer tube.

[0008](3) A catheter with an expansion body given in the above (2) whose tip part said metal reinforcement body is tubular and is a coiled form.

[0009]A tip end part of an outer tube which a catheter with an expansion body of this invention becomes from a base end and bridge construction olefin system resin of an expansion body which consists of bridge construction olefin system resin like the above (1) is connected by weld. As compared with bridge construction olefins, such fusion splicing has high compatibility and can realize firm weld. Adhesion of a body part and a tip end part consists of weld of bridge

construction olefin system resin and unconstructed bridge olefin system resin similarly, and an outer tube serves as firm weld, and via a tip end part of unconstructed bridge olefin system resin, although it is indirect, It becomes possible to connect firmly an outer tube of bridge construction olefin system resin, and an expansion body of bridge construction olefin system resin.

[0010]What constructed the bridge slightly is included here unconstructed bridge olefin system resin not only shows a non-bridging body of olefin system resin, but, and what has a degree of cross linking lower than bridge construction olefin system resin is included.

[0011]Such fusion splicing is realizable as follows.

[0012]1. Lay a part of body part of through and bridge construction olefin system resin on top of a tip end part of an outer tube of unconstructed bridge olefin system resin for metaled rodding. This overlapping portion is should weld.

[0013]2. Put heat-shrinkable tubing made from silicone so that it continues, and it may weld and a portion of ** may be covered; and heat from heat-shrinkable tubing made from silicone. Since heat-shrinkable tubing made from silicone is heated where it carried out heat contraction, it welded and ** is stuck strongly, strong fusing strength is obtained.

[0014]3. Heat after piling up a base end of an expansion body, supposing "Weld a superposition part" and putting heat-shrinkable tubing made from silicone at a tip of a tip end part further next. A terminal area of strong fusing strength is obtained like the above 2.

[0015]Thus, it is easily realizable of high connection of fusing strength.

[0016]Next, since a metal reinforcement body was provided inside a body part of an outer tube like the above (2), torque convectivity is also high and the pushing characteristic also improves.

[0017]A reinforcement body is made tubular like the above (3), and a tip comes to be excellent in kink-proof nature by having considered it as a coiled form. As a method of forming in an outer tube, such a reinforcement body, A larger thing than a coil is beforehand prepared for a path of an outer tube, and if it heats after inserting a coil into this outer tube (however, a coil is not inserted in order that a predetermined portion may presuppose from a tip "weld"), an outer tube will be in the state where contracted and it stuck to an outside surface of a coil. When an outer tube and a reinforcement body stick thoroughly, it excels in torque convectivity, and kink-proof nature also improves and it comes to excel in operativity.

[Translation done.]

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EXAMPLE

[Example]Hereafter, with reference to the example of this invention, the contents of the invention are explained in detail.

[0019]

[Work example 1]Drawing 1 is the general drawing of the catheter 10 with an expansion body of this invention. Drawing 2 is the expansion part sectional view of a tip end part to which the expansion body of the catheter 10 with an expansion body was attached.

[0020]As shown in a figure, the catheter 10 with an expansion body consists of the inner tube 1, the outer tube 2, the expansion body 3, and the hub 4 provided in the end face.

[0021]The inner tube 1 is a product made from high density polyethylene the thickness of 0.075 mm, and 1500 mm in length in 0.6 mm in diameter, and in order to have a base end and the tip part 12, to have the 1st lumen 14 in which the tip 13 carries out an opening and to show the position of the expansion body 3, the X ray imaging marker (platina coil) 15 is established.

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DESCRIPTION OF DRAWINGS

[Brief Description of the Drawings]

[Drawing 1]Drawing 1 is the general drawing of the catheter with an expansion body of this invention.

[Drawing 2]Drawing 2 is the expansion part sectional view of a tip end part to which the expansion body of the catheter with an expansion body of this invention was attached.

[Drawing 3]Drawing 3 is a figure for explaining the fusion method of the body part and tip end part of an outer tube.

[Drawing 4]Drawing 4 is a figure for explaining the fusion method of the tip end part of an outer tube, and the base end of an expansion body.

[Drawing 5]Drawing 5 is a fragmentary sectional view of the catheter with an expansion body concerning the 2nd example of this invention.

[Drawing 6]Drawing 6 shows the mounting part of the expansion body of the conventional catheter with an expansion body.

[Description of Notations]

10 ... Catheter with an expansion body

1 ... Inner tube 1

2 ... Outer tube

3 ... Expansion body

4 ... Hub

12 ... Tip part

13 ... Tip

14 ... The 1st lumen

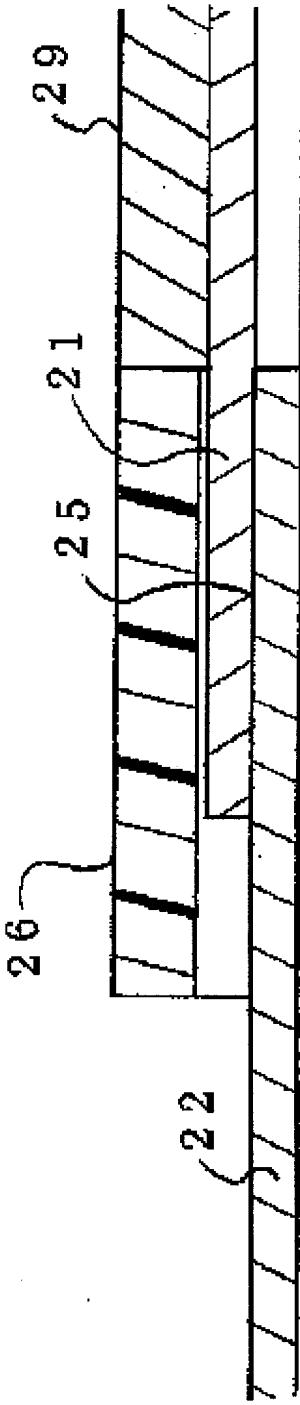
15 ... X ray imaging marker

21 ... Body part

22 ... Tip end part

- 23 ... Position which retreated
- 24 ... The 2nd lumen
- 25, 27 ... Weld.
- 26 ... Heat-shrinkable tubing made from silicone
- 28 ... Armored tube
- 29 ... Protective tubing
- 31 ... Tip part
- 32 ... Base end
- 41, 42 ... Opening
- 50 ... Rodding
- 101 ... Inner tube 101
- 102 ... Outer tube 102
- 103 ... Expansion body
- 105 ... Base end
- 106,107 ... Weld.

[Translation done.]



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